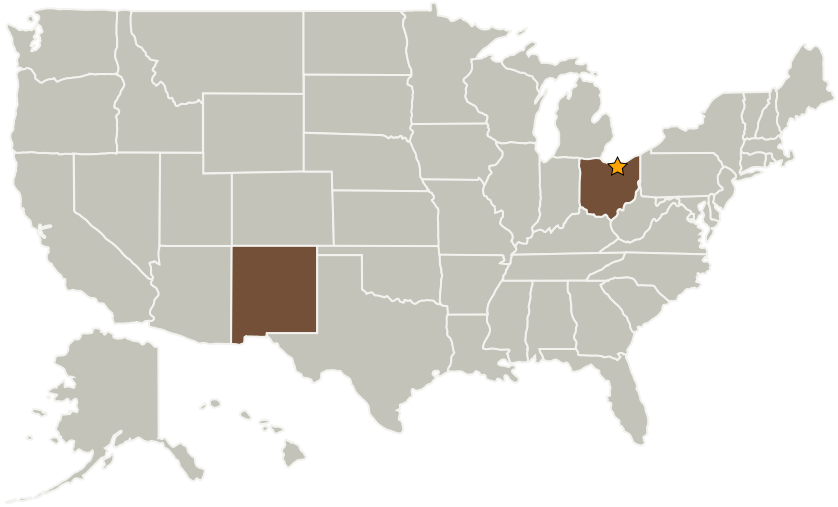
Mirage Fire Sensor for Spacecraft, Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

Spacecraft fires create exception risks to crew members. There is usually no place to escape. Even small amounts of hardware damage can compromise a mission. The most effective fire extinguishing agents, Halons, are prohibited because of the toxicity and corrosiveness of combustion byproducts. Early warning fire sensors are needed that can operate effectively in zero gravity; that means no convection to transport smoke or fire-generated gases to point sensors. Avionics compartments are often densely packed and filled with dead spaces that do not exchange air well with circulating air streams. Southwest Sciences proposes the development of a thermal mirage sensor for detecting incipient spacecraft fires. The sensor will use highly miniaturized, low power cameras to image a simple geometric pattern projected onto a flat surface. Thermally induced image distortions will provide early fire warning. The sensor will operate autonomously; we anticipate a networked set of such sensors, each having sufficient signal processing capability to determine sensor health and alarm conditions. Our innovation includes the use of highly miniaturized, low cost components. The cross line projector is a laser pointer combined with a small (4 mm × 4 mm) piece of etched clear plastic; diffraction forms the line pattern. There are no moving parts.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Southwest Sciences, Inc.	Supporting Organization	Industry	Santa Fe, New Mexico

Primary U.S. Work Locations	
New Mexico	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

David Bomse

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.4 Environmental Monitoring, Safety, and Emergency Response
    - TX06.4.2 Fire: Detection, Suppression, and Recovery